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MIDWINTER OBSERVATIONS IN SOUTHEASTERN MISSISSIPPI AND EASTERN LOUISIANA

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On the way to and from the meetings of the American Association for the Advancement of Science in New Orleans last winter I passed through some parts of Mississippi and Louisiana which have rarely if ever been mentioned in botanical literature, and were of particular interest for that reason, as well as for their similarity to some parts of the coastal plain of Georgia which I had been studying for several years; and I was able to make a few observations *en route* which seem worth preserving.

Although many plants from various parts of Mississippi—chiefly from along the coast—have been distributed in recent years to the larger herbaria of the country by Tracy, Earle, Pollard, Kearney, Lloyd and others, none of these specimens that I have seen are accompanied by any information as to their surroundings in nature, and very little has been published about the vegetation of the Mississippi mainland in modern times. In fact there seems to be as yet no better account of the phytogeography of the whole state than Dr. E. W. Hilgard's "Report on the Geology and Agriculture of the State of Mississippi," which appeared in 1860. And in this admirable work, though the descriptions of purely geographical features can hardly be improved on even at the present day, the native plants are mentioned only incidentally, and a complete enumeration of them is not attempted. Moreover, this report was written when there was no better manual for the region than Torrey & Gray's

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uncompleted Flora of North America, so it is not surprising that a good many of the plants were wrongly identified by Dr. Hilgard, through no fault of his.

In view of these conditions any one entering the state of Mississippi for the first time can hardly have a very definite idea of what to expect there in the way of vegetation. Louisiana is still more of a *terra incognita* phytogeographically, though from the standpoint of the systematist there is perhaps not much more botanical work to be done in either state, since nearly all the indigenous species are doubtless already known to science. The following fragmentary notes, though made at the most unpromising season of the year, may contribute in some slight degree to a better understanding of the vegetation (as distinguished from the flora) of this part of the coastal plain.

I entered Mississippi a little south of the middle of its eastern border, in Lauderdale County, in the Lower Eocene region of the coastal plain, on the afternoon of December 26, 1905. From the state line to Meridian, and in fact all the way through Lauderdale, Clarke and Jasper counties, *Pinus glabra* was common* and *Magnolia grandiflora* frequent in hammock lands along streams. These two trees, which have very nearly the same range and habitat, at least in Georgia and Alabama, are probably not found much farther inland in Mississippi than where I first noticed them. *Pinus palustris* was seen occasionally in Clarke and Jones counties, but I had scarcely entered the pine-barrens proper when it became too dark for further observations, the train I was on being unfortunately over an hour late, as is often the case at that season of the year.

The topography of this Eocene region of Mississippi is quite varied, a little more so perhaps than the corresponding parts of Georgia and Alabama. Several inland-facing escarpments (or *cuestas*, as they are sometimes called by geographers) in the vicinity of Meridian are high enough to be known locally as "mountains," and the railroads follow rather sinuous courses in getting over them. A little above Enterprise, in Clarke County,

* Its occurrence in Clarke County is mentioned on page 344 of Dr. Hilgard's book above cited, under the name of "Bottom White Pine."

a creek near the railroad flows for some distance over rocky shoals, * rather an unusual sight in the coastal plain.

The next day, the 27th, was spent in company with Dr. Eugene A. Smith, state geologist of Alabama, in examining some of the geological and botanical features of the northwestern corner of Perry County, between Hattiesburg and Monroe station. Perry County is not only entirely within the pine-barrens, but also in a region analogous to if not continuous with the Altamaha Grit region of Georgia. † Along the Bowie River and some of its tributaries, near Bowie station, is exposed several feet of a soft pale-greenish or yellowish aluminous rock devoid of fossils (known to geologists as the Hattiesburg phase of the Grand Gulf formation), to all appearances identical with the outcrops of Altamaha Grit on banks of streams in southeast Georgia, four or five hundred miles farther east. But there are certain differences in the topography and flora in the two states which I am not quite prepared to explain. For instance the creeks and small rivers in this part of Mississippi have pretty well defined "second bottoms" along them, with a sort of hammock flora, including among other things *Fagus americana*, *Illicium floridanum* and *Kalmia latifolia*, ‡ species which I have never seen in the Altamaha Grit region of Georgia, though the *Fagus* and *Kalmia* come right up to its borders. Similar bottom-lands with about the same vegetation can be seen at a number of places in southern Alabama.

The flora of dry pine-barrens on the neighboring hills seems very similar to that in the corresponding parts of Georgia and Alabama, § as nearly as I could determine at that season, but moist pine-barrens and branch-swamps are very poorly developed in that vicinity, probably because of the absence of the super-

* Prof. S. M. Tracy has distributed specimens of *Podostemon abrotanoides* Nutt. (nos. 3257 and 3258, collected June 12, 1897) from the vicinity of Enterprise, which presumably came from this place or one very similar.

† See Bull. Torrey Club 32: 141-147. 1905.

‡ For a list of some other woody plants growing in such situations see page 349 of Dr. Hilgard's report.

§ *Aster adnatus*, *Helianthus Radula*, *Myrica pumila*, *Quercus marylandica* and *Q. digitata* were some of the species noted.

ficial layer of Columbia sand, which in most of the little valleys in the pine-barrens of Georgia holds water like a sponge, allowing the development of a rich and characteristic bog flora. A mile or two west of Hattiesburg I noticed a good many specimens of *Pinus Elliottii*, both young and old. This is a little out of the range usually given for this tree, and probably near its northwestern limit.

The appearance of Hattiesburg itself would to a careful observer indicate the close analogy between this part of Mississippi and the Altamaha Grit or wire-grass region of Georgia. Like many of the newer cities in "Wire-grass Georgia," Hattiesburg (which is larger than any of them) owes its existence and rapid growth primarily to *Pinus palustris*, but is no longer dependent on this diminishing source of wealth. Its neat and prosperous appearance is well matched by most of the cities in the corresponding part of Georgia, but not altogether by those in the Lower Oligocene pine-barrens a little farther inland.

Going from Hattiesburg to New Orleans on the morning of the 28th, I passed through a country resembling Southeast Georgia even more closely than that seen the day before. The topography which came into view at daybreak, about thirty miles southwest of Hattiesburg, seemed almost a perfect match for that which I consider typical of the Altamaha Grit region.* Branch-swamps are well developed, and contain apparently about the same kind of vegetation as is found in similar situations in Georgia, though perhaps not quite so many species, on account of the greater distance from the centers of distribution of pine-barren plants. The prevailing trees in the branch-swamps seemed to be *Pinus Elliottii*, *Nyssa biflora*, *Liriodendron Tulipifera* and *Magnolia glauca*.

The rolling topography continued without much variation the rest of the way across Mississippi, but immediately on crossing the Pearl River into Louisiana the aspect of the country changed considerably. All the way between the two channels of this river, a distance of five or six miles, there seemed to be nothing but

* The topography and other geographical features of a region midway between Hattiesburg and New Orleans are described by Smith and Carter in the soil survey of the McNeill area, Mississippi (Field Operations of the U. S. Bureau of Soils for 1903).

swamps, hammocks and bottom lands, containing such trees as *Taxodium distichum*, *Betula nigra*, *Quercus laurifolia*, *Magnolia grandiflora*, *Liquidambar*, *Ilex opaca* and *Nyssa uniflora*, all more or less draped with *Tillandsia usneoides*. No *Platanus* was seen, probably for the same reasons that it is almost wanting in the pine-barrens of Georgia and Alabama, even along the larger rivers.* Between the Pearl River and Lake Pontchartrain are extensive flat wet pine-barrens, very much as in the maritime counties of Georgia.† *Pinus Elliottii*, which comes within two or three miles of the river on the Mississippi side, was not seen in Louisiana, where *P. Taeda* largely takes its place (as it does also in the Carolinas). Here I noticed *Taxodium imbricarium* ‡ for the first time on this trip, a few specimens between Alton and Slidell.

On approaching Lake Pontchartrain the pine-barrens pass rather suddenly into salt (or brackish?) marshes, without any other "plant-formation" intervening. The same phenomenon was soon afterward observed on the Mississippi coast, though in Georgia there seems to be always at least a mile of live-oak hammock or something of that sort between the pine-barrens and the marshes. The reason for this difference is as yet obscure.

After crossing a few miles of marshes, five or six miles of open water, and then a few miles of cypress swamps, New Orleans was reached. The country around New Orleans is of course very flat, and the surface all Quaternary alluvium. During my stay there the only natural plant-habitats which I was able to find in the vicinity were the cypress swamps. These are doubtless well known to most of the botanists who have visited New Orleans or resided there, but they are rarely if ever adequately described. They probably once covered the whole country for miles around, except the slightly higher areas near the river which are said to have formed§ natural levees. Going due north from the city to

* See Bull. Torrey Club 32 : 147. 1905.

† See Ann. N. Y. Acad. Sci. 17 : 19-20. 1906.

‡ See Bull. Torrey Club 29 : 383-389, 393-399 ; 32 : 105-115.

§ In the soil survey of the New Orleans area (Field Operations of the U. S. Bureau of Soils for 1903) these swamps are mapped as "Sharkey Clay" and "Muck," and are said to cover about 68 per cent. of the area around New Orleans. A crude description of their vegetation is also given.

West End on Lake Pontchartrain one passes through several miles of these swamps, which are practically untouched except for having had a few of the cypress trees cut out. At the time of my visit they were full of water, but I was told that they sometimes become dry enough to walk about in.

The three most abundant and conspicuous plants in the cypress swamps are *Tillandsia usneoides*, *Taxodium distichum* and *Sabal*



FIGURE I. Scene in the pine-barrens near 18th St. and 32d Ave., Gulfport, Miss., within half a mile of the Gulf, looking west, Jan. 3, 1906. *Pinus palustris*, *Serenoa* and *Quercus Catesbaei* in dry pine-barrens in the foreground. Denser vegetation along a small stream at the right, including the three commonest trees of such situations, *Pinus Elliottii*, *Magnolia glauca*, and *Nyssa biflora*.

Adansonii, the first two giving an indescribably weird and somber aspect to the winter landscape. Other species noted at the same time and place were three small trees, *Salix nigra*, *Acer rubrum* and *Fraxinus caroliniana*(?), one shrub, *Baccharis halimifolia*, and the following herbs (all but one of them monocotyledons): *Typha latifolia*, *Limnobiium Spongia*, *Sagittaria lancifolia*, *Zizania aquatica*, *Panicum gymnocarpon*, *Cladium effusum*, *Pontederia cordata* and *Hibiscus* sp. All of these have a pretty wide distribution, being found also near the Georgia coast, though not associated in the same way there, for these swamps seem to have no counterpart much farther east.

Whatever natural plant-communities may have originally occupied drier ground in the immediate vicinity of New Orleans have probably long since disappeared, for dry land is of course at a premium there.

Leaving New Orleans on January 3, 1906, I went eastward along the coast to Mobile, stopping about an hour and a half at Gulfport, Mississippi. All along the Mississippi coast the pine-barrens, which are rather flat, come very close to the shores of the Gulf, sometimes within a few hundred feet.

On the way to Mobile I first noticed *Pinus Elliottii* near Waveland, in Hancock County, Mississippi, *Serenoa serrulata* on the eastern shore of Bay St. Louis, in Harrison County, and *Quercus geminata* between Pass Christian and Long Beach, in the same county. Whether these species extend farther west or not I am not informed. All three of them, it should be observed, seem to be almost confined to the Columbia sand, which is probably not very well developed in Louisiana.

At Gulfport,* where I had a few minutes in which to examine the pine-barrens near the city, I could detect a faint development of the same sort of topography which characterizes the Altamaha Grit region of Georgia. † Among the plants noted in the

* A short description of Gulfport, from the popular or commercialistic standpoint, can be found in the Review of Reviews (33 : 194, 195) for February, 1906.

† See Bull. Torrey Club 32 : 146. 1905. The descriptions of the topography, vegetation, industries and other geographical features, in the soil survey of the Biloxi area (which includes Gulfport and most of Harrison County) by Hearn and Carr (Field Operations of the U. S. Bureau of Soils for 1904), would fit some parts of southeast Georgia almost exactly.

environs of Gulfport was that little-known *Sarracenia* which until recently was confused with *S. flava*. (I saw it also the next day in the northwestern part of Mobile County, Alabama.) Prof. J. M. Macfarlane* has pointed out its distinguishing characters, but in view of its present known range his referring it to *S. Catesbaci* Ell. seems unwarranted. According to his (unpublished) observations it does not occur east, nor *S. flava* west, of the Alabama River; and since traveling through most of the coastal plain counties of Alabama I can offer no evidence to the contrary.

Between Gulfport and Biloxi the country looks much like the flat pine-barrens 50 to 100 miles back from the coast in Georgia, and the vegetation is also very similar. Shallow ponds, with *Pinus Elliottii*, *Nyssa biflora* and *Ilex myrtifolia*, are frequent, and *Taxodium imbricarium* was seen a little west of Biloxi. In most places the pine-barrens are not yet even turpented (which is rather unusual at the present day), though this railroad has been in operation about 35 years, it is said.

Soon after entering Jackson County (just across a narrow bay from Biloxi) the "pine meadows" which have been described by Hilgard † and others ‡ began to appear, and they continued most of the way to the Alabama line. In these park-like "meadows" (which by the way have no exact counterpart in Georgia) there are almost no trees except *Pinus palustris* and *P. Elliottii*, and these are of low growth, only thirty or forty feet tall. The only evergreen shrubs noticed were *Ilex glabra* and *Serenoa*. The surface of the country is very flat, with few streams, and the superficial sand seems to be thinner than it is a little farther west, or perhaps entirely absent. Many of the trees, doubtless the larger ones, have been cut out, but the region is very sparsely settled, and sometimes no houses, roads or fields were visible for several miles. At present these pine meadows do not seem to be utilized for anything but sheep ranges.

Why the pines are so stunted in such places I was not able to

* Trans. and Proc. Bot. Soc. Pa. 1: 426-434. 1904.

† Geol. and Agric. Miss. 370, 371. 1860.

‡ E. A. Smith, Geol. of the Coastal Plain of Ala. 101. 1894.

determine by merely passing through on a fast train, but it seems likely that the land is a little too flat and wet for the best development of *Pinus palustris* and a little too dry and perhaps not sandy enough for *Pinus Elliottii* to grow well, and that no other trees have happened to gain a foothold. The winds from the nearby Gulf may have something to do with keeping the pines down to a uniform height.

In the southeastern part of Jackson County, near the Alabama line, *Taxodium imbricarium* is quite common in ponds. Before making this trip I had no definite information as to its occurrence farther west than Alabama, except Dr. Hilgard's mention of cypress ponds in the maritime counties of Mississippi.*

OBSERVATIONS ON THE OCCURRENCE OF BOOTT'S FERN

BY PHILIP DOWELL

These observations are quite limited, both in regard to the time and the area covered, more limited than might be desired for publication, but they may serve to bring out others more exhaustive and thus help to further our knowledge of the origin and distribution of *Dryopteris Boottii* (Tuckerm.) Underw. They are recorded now partly in response to an appeal made in the *Fern Bulletin* by Professor A. B. Klugh for further information in line with his own observations on this fern.† Speaking of the occurrence of the fern in Ontario he says: "It never occurs in any abundance, most usually in a single plant . . . it is exactly intermediate between its possible parents . . ."

I find no record of the fern having been found on Staten Island before 1903, when a single clump of three plants was found in a woodland swamp near South Avenue. This is a remnant of virgin forest and is a favorable place for the Goldie, Clinton, crested,

*Op. cit., pp. 367, 368. The "long-leaf pine" mentioned by Dr. Hilgard as growing in the same ponds is of course *Pinus Elliottii*, which was not recognized as distinct until twenty years later.

† *Fern Bulletin* 13: 86. Jl 1905. 14: 70. Jl 1906.